

LA-UR-21-26422

Approved for public release; distribution is unlimited.

Title: Atalanta Program Computer Science Overview

Author(s): Kelly, Kathleen Ann

Intended for: Student Intern presentation (high school students)

Issued: 2021-07-07

Disclaimer:

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by Triad National Security, LLC for the National Nuclear Security Administration of U.S. Department of Energy under contract 89233218CNA000001. By approving this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.



Atalanta Program Computer Science Overview

Kathleen (Kaki) Kelly
HPC-SYS
LANL

July 8, 2021

Replace and add LA-UR number

Overview: Computer Science

- What is Computer Science?
- Related fields: Computer Science vs Computer Engineering
- Types of jobs held by folks with certain degrees (BS, MS, PhD)

What is Computer Science?

- Example
 - A calculator in python
 - Example of simple command line calculator
 - Example of graphical scientific calculator
- Questions
 - Can i calculate the sum of 2 numbers?
 - Can I balance my checkbook?
 - Can I calculate the various distances between the planets?
 - Can I run this on my iphone??

What is Computer Science?

Study of algorithmic processes, computational machines and computation

- Software engineering
 - who is the audience for the code? (School Teacher? Accountant? Physicist?)
 - how will they be using the code? (command line? Graphic interface?)
- Analysis of algorithms
 - how long is it taking for my code to run?
 - can i improve the efficiency of my code?
- Operating system principles
 - will my code need to run on a specific architecture? (MacOS, Windows, Linux)
 - how will several codes run on a system at the same time?
- Computer architecture
 - which architecture will run my code most efficiently?
 - will my code need to run across several systems at the same time?

What is Computer Engineering?

Study that integrates electronic engineering with computer science

- Computer architecture
 - How do i measure efficiency of a system
 - Can I design a better motherboard (faster memory access?)
- Electrical engineering
 - Can I improve the design of a system to make it more efficient? (less power usage)
 - Can i make circuits on a motherboard smaller?
- Network engineering
 - Can i design a fast network device to allow hundreds of systems to connect quickly
- Embedded systems
 - How lightweight can i make a device with full functionality (mobile phones? hearing aids?)
 - Computers in appliances

Degrees

- Bachelors - 4 years
 - Application development, System administration, Network management, User interface design, Web development
- Masters - 6 years
 - Similar jobs but with more specialization towards improving and designing processes and environments in each area, more overall understanding of various subjects
- PhD - 8+
 - Teaching at University level
 - Research into future technologies and developments

Activity

- [LANL History of Computing](https://hpchistory.lanl.gov/#vars!panel=10848213!)
 - <https://hpchistory.lanl.gov/#vars!panel=10848213!>
- [Timeline of women in computing](https://int.lanl.gov/employees/diversity/resource-groups/women-computing/index.shtml)
 - <https://int.lanl.gov/employees/diversity/resource-groups/women-computing/index.shtml>

Questions?